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EXAMINER	
HYUN, SOON D	

ART UNIT	PAPER NUMBER
2663	

DATE MAILED: 06/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/747,658	ALASTI ET AL.	
	Examiner	Art Unit	
	Soon D. Hyun	2663	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 December 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-47* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-42 and 45-47* is/are rejected.

7)☒ Claim(s) *43 and 44* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claims 20-28, 33 and 45-47 are objected to because all instances of "configured to" in each claim should be deleted to make the claim positive. Languages such as "adapted to/for", configured to/for", or arranged to/for" (or similar phrases such as "enabled to", "capable of', etc.) are not considered positive recitation per MPEP 2106.

In claim 28, line 5 and 10, respectively, "activation-link" should be changed to – activate-link -- to avoid lack of antecedent basis.

In claim 44, line 1, "claim 42" should be changed to – claim 43 --.

In claim 46, line 1, "claim 46" should be changed to – claim 45 --.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 10, 13, 15, 16, 18, 19, and 21-23 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which is not described in the specification.

In claim 10, line 3 "any grants received at that output port " is not supported by the specification, i.e., with reference to FIG. 2, the accept arbiter receives any grants, not the output port.

In claims 13, 15 and 18, the steps of sending a grant from the first port and the second port are not supported by the specification.

In claims 16 and 19, line 3, "any grants received at the first input port " is not supported by the specification, i.e., with reference to FIG. 2, the accept arbiter receives any grants, not the input port.

In claims 21, lines 3-4, a selection unit to receive arbitration signal from an output port is not supported by the specification.

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 34-42 and 45-47 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claims 34-42, it is not clear what is defined for "input arbiter(s)" and output arbiter(s)."

Regarding claim 40, line, 2, it is not clear what is meant by "the group."

Regarding claim 45, it is not clear what are meant by the "first-stage" and "second-stage", i.e., for performing arbitration, it is not clear whether the second-stage arbitration is followed by the first-stage arbitration. Those of skill in the art understand that the first-stage should be provided before the second-stage if two stages are necessary for processing . With reference to FIG. 8, a first-stage arbiter (442) and a second-stage arbiter (443) are performing a grant step at t1 and a first stage arbiter (442') and a second stage arbiter (443') are performing an accept step at t2, i.e., the

accept step is followed by the grant step. Therefore, all arbiters performing the grant step should be called as first-stage arbiters and all arbiters performing the accept step should be called as second-stage arbiters, thus, each second-stage arbiter sending a grant signal to a first stage arbiter as recited in claim renders the claim as being indefinite.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-14, 17, 20, 24, 25, 28, 29, 30, 34, 39, and 42 are rejected under 35 U.S.C. 102(b) as being anticipated by McKeown (U.S. Patent No. 5,500,858).

Regarding claim 1, McKeown discloses (FIG. 1) a method for arbitrating for a switch fabric (22) having a plurality of ports (queues, Q-1 to Q-N), each port having plurality of links (links form FIFOs 24-1 to 24-N for each queue) comprising:

determining, on a port basis (e.g., Q-2), a subset of links (two links from FIFO 24-1 and 24-2 for Q-2) that have requested an access to corresponding output device (C-1 and C-2) from the plurality of links (N links from FIFOs) associated with that port, each link from FIFO 24-1 and 24-2 has a candidate packet (cell) buffered and destined for the corresponding output devices, each FIFO in the Q-2 has a weight value (a vector position associated with a rotating priority), see col. 4, lines 38-40, col. 5, lines 5-6; and

selecting a link from one of the FIFO 24-1 and FIFO 24-2 based on the weight values, see col. 5, lines 14-28.

Regarding claim 2, McKeown further discloses that a link having higher priority element is selected, i.e., the weight value for the selected link for the port is greater that the weight value associated with each remaining link (col. 5, lines 25-28).

Regarding claim 3, McKeown further discloses that the weight value of each link corresponds to a priority (grant pointer and accept pointer, col. 5, line 63-col. 6, line 4) for that port (Q-2) and a second port (for output device C-1 or C-2 in FIG. 1 connected to the link).

Regarding claim 4, McKeown further discloses that each FIFO buffers a cell, see col. 4, lines 36-37).

Regarding claim 5, McKeown discloses (FIG. 1) a method for arbitrating for a switch fabric (22) having a plurality of output ports (for output devices C-1 to C-N, col. 4, line 36), each output port having plurality of links (connected to input ports Q-1 to Q-24) comprising:

determining, on a port basis (e.g., for C-1), a subset of links (connecting the output device C-1 to queues having a cell destined for the C-1), each link from the subset of links has a weight value (a vector position associated with a rotating priority), see col. 4, lines 38-40 and col. 5, lines 5-13).

selecting a link from the subset of links based on the weight values for the links, col. 5, lines 5-13). For the output port for C-2, same procedure is required for

arbitration. Therefore, McKeown teaches that the determining and selecting are performed on a per output port basis.

Regarding claim 6, McKeown further discloses that Q-1 and Q-2 are trying to access to the output port for C-1 with an access request, respectively. The steps of the determining and selecting of Q-1 or Q-2 are performed (col. 5, lines 6-9) and then a grant to the request from corresponding queue is sent to the selected queue.

Regarding claims 7 and 8, refer to the discussion for claim 1, McKeown further discloses an example of two FIFOs (24-1 and 24-2) in the Q-2 (col. 5, lines 17-22). The FIFO 24-1 and FIFO 24-2 in Q-2 are requesting access to the output devices C-1 and C-2, respectively. Both requests are granted, but one grant is accepted, i.e., one of the FIFOs in the Q-2 with higher priority is selected to send the cell. Therefore, McKeown teaches that the determining and selecting are performed on a per input port basis.

Regarding claim 9, refer to the discussion for claim 6. McKeown further discloses that Q-1 and Q-2 are trying to access to the output port for C-1, the steps of the determining and selecting of Q-1 or Q-2 are performed (col. 5, lines 6-9) and then a grant to the request from corresponding queue is sent to the selected queue.

Regarding claim 10, refer to the discussion for claims 5 and 6, when Q-1 and Q-2 art trying to access to one output device, the out put device (output port) receives access requests from each Queue (Examiner understand that the access requests are equivalent to the grants in the claim, because the access requests are granted to request after determining and selecting as discussed for claim 7).

Regarding claims 11 and 14, McKeown discloses (FIG. 1) a method for arbitrating for a switch fabric (22) having a plurality of output ports (for output devices C-1 to C-N in FIG. 1 and col. 4, line 36), each output port having plurality of links (connected to input ports Q-1 to Q-24) comprising:

determining, for a first output port (for C-1), a subset of links (connecting the output device C-1 to queues (any queues of N queues in FIG. 1) having a cell destined for the C-1), each link of the subset has a weight value (a vector position associated with a rotating priority), see col. 4, lines 38-40 and col. 5, lines 5-13).

selecting a link from the subset of links based on the weight values for the links (col. 5, lines 5-13). Therefore, McKeown teaches that the determining and selecting are performed on a per output port basis.

For the output port for C-2, same procedure is required for arbitration regardless of the output port C-1. Therefore, McKeown teaches that the determining and selecting for the output ports for C-1 and C-2 are performed in parallel.

Regarding claim 12, McKeown further discloses that the weight value of each link corresponds to a priority (grant pointer and accept pointer, col. 5, line 63-col. 6, line 4) for that port (for C-1) and a second port (one of the queues in FIG. 1) connected to the link.

Regarding claim 13, refer to the discussion for claim 11, the first port and a second port are the output ports for C-1 and C-2.

McKeown further teaches that a grant for C-1 and a grant for C-2 are received at third port (an input port Q-1) and one link is selected based on the weight values (see the discussion for claim 5 and col. 5, lines 14-28).

Regarding claim 17, McKeown discloses (FIG. 1) a method for arbitrating for a switch fabric (22) having a plurality of ports (queues, Q-1 to Q-N), each port having plurality of links (links form FIFOs 24-1 to 24-N for each queue) comprising:

determining, for a first input port (Q-2), a subset of links (two links from FIFO 24-1 and 24-2 for Q-2) that have requested an access to corresponding output device (C-1 and C-2) from the plurality of links (N links from FIFOs) associated with that port, each link from FIFO 24-1 and 24-2 has a candidate packet (cell) buffered and destined for the corresponding output devices, each FIFO in the Q-2 has a weight value (a vector position associated with a rotating priority), see col. 4, lines 38-40, col. 5, lines 5-6; and

selecting a link from one of the FIFO 24-1 and FIFO 24-2 based on the weight values, see col. 5, lines 14-28.

For a second input port Q-1, same procedure is required for arbitration regardless of the first input port Q-2.

Regarding claim 20, McKeown discloses an apparatus (FIG. 6), comprising:

a plurality of input ports (Q-1 and Q-2);

a plurality of output ports (for output devices C-1 and C-2 in FIG. 1) and each being coupled to each input port by a link; and

a plurality of arbiters (GSU-1 to ASU-2 in FIG. 6), each being uniquely associated with one output port (col. 7, lines 25-26), the plurality of arbiters being operate in parallel

with each other, a first arbiter being associated with a first output port (for C-1), a first arbiter (GSU-1) having a selection unit to transmit an arbitration signal (a grant) based on a weight value associated with each link associated with the first output port and having a candidate packet (col. 7, lines 16-30 and see the discussion for claim 1 and 11).

Regarding claim 24, McKeown discloses an apparatus (FIG. 6), comprising:

a plurality of input ports (Q-1 and Q-2);

a plurality of output ports (for output devices C-1 and C-2 in FIG. 1) and each being coupled to each input port by a link; and

a plurality of arbiters (ASU-1 and ASU-2 in FIG. 6), each being uniquely associated with one input port (col. 7, lines 32-42), the plurality of arbiters being operate in parallel with each other, a first arbiter (ASU-1) being associated with a first input port (Q-1), the first arbiter having a selection unit to transmit an arbitration signal (an accept signal) based on a weight value associated with each link associated with the first input port and having a candidate packet (col. 7, lines 16-30 and see the discussion for claim 1 and 11).

Regarding claim 25, McKeown further discloses that an arbiter (GSU-1) associated with a first output port (for C-1) and having a selection unit to receive one arbitration signal (an access request) from respective input port (Q-1), the selection unit of the arbiter associated with the first output port being to transmit an arbitration signal (grant) based on a weight value associated with each link.

Regarding claim 28, McKeown discloses an apparatus (FIG. 6), comprising:

a first selection unit (GSU-1) associated with its own plurality of links (from Q-1 to Q-N), the first selection unit receives an activate-link signal (signal for an access request, col. 4, lines 45-50) and transmits an arbitration signal based on a weight value associated with each link and based on the activation-signal (col. 5, lines 5-18 and col. 7, lines 31-42) received at the first selection unit;

a second selection unit (GSU-2), same procedure is required for arbitration.

a third selection unit (ASU-1) to receive any arbitration signals (grants) from a GSU (any of GSU-1 to GSU-N), the third selection to transmit an arbitration signal (an accept signal) based on a weight value.

Regarding claim 29, McKeown further discloses that the first selection unit (GSU-1) is associated with a first output port (for C-1, see col. 7, lines 25-26), each link couples the first output port to an input port (one of Q-1 to Q-N), the arbitration signal for the first selection unit indicates a grant associated with the first output port (for C-1) and with an input port (one of Q-1 to Q-N); the second selection unit (GSU-2) is associated with a second output port (for C-2), each link for the second selection unit couples the second output port (for C-2) to an input port (one of Q-1 to Q-N), the arbitration signal for the second selection unit indicates a grant associated with the second output port and with an input port (one of Q-1 to Q-N).

Regarding claim 30, McKeown further discloses that the third selection (ASU-1) unit is associated with a first input port (Q-1), the arbitration signal to be transmitted from the third selection unit indicates an accept associated with the first input port and

any output ports associated with any respective arbitration signal received at the third selection unit (col. 7, lines 25-26).

Regarding claim 34, McKeown disclose a method for arbitration for a switch (FIG. 6), comprising:

determining, in a first time slot (col. 4, lines 36-37), a plurality of grants associated with a plurality of output arbiters (GSU-1 and GSU-2); and

determining, in the first time slot, a plurality of grants associated with a plurality of input arbiters (ASU-1 and ASU-2), see col. 7, lines 16-42..

Regarding claim 39, McKeown discloses a method for arbitrating for a switch (FIG. 6), comprising:

determining a grant for a first output arbiter (ASU-1) from a plurality of output arbiters (ASU-1 to ASU-N), i.e., GSU-2 determines which one of input requests to be granted (a grant) to ASU-1;

determining a grant for a first input arbiter (GSU-1) from a plurality of input arbiters (GSU-1 to GSU-N), i.e., GSU-1 determines which one of access requests received at the GSU-1 to be granted, determining the grant for the first input arbiter being performed in parallel with the determining the grant for the first output arbiter;

determining an accept for a second input arbiter (GSU-2) based on the determined grant for the first output arbiter; i.e., ASU-1 determines if a grant from GSU-2 would be accepted based on the grant from GSU-1 (a grant with higher priority is accepted);

determining an accept for a second output arbiter (ASU-2) from the plurality of output arbiters based on the determined grant for the first input arbiter, i.e., ASU-2 determines one of the grants received at the ASU-2 to be accepted, the determining the accept for second output arbiter being performed in parallel with the determining the accept for the second input arbiter, see col. 7, lines 16-42.

Regarding claim 42, McKeown discloses a method for arbitrating for a switch fabric (22 in FIG. 6), comprising:

determining (by GSU-1in FIG, 6), for a first output port (for C-1), a link from a plurality of links associated with the first output port based on a weight value associated with each link from a subset of links from the plurality of links (see discussion for claims 1 and 11), each link from the subset of links being associated with its own candidate packet, and

determining (by ASU-1), for a first input port (Q-1), a link from a plurality of links associated with the first input port based on a weight value associated with each link from a subset of links from the plurality of links, each link from the subset of links being associated with its own candidate packet, the determining for the first input port being performed in parallel with the determining for the first output port.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 26, 27, and 31-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over McKeown (U.S. Patent No. 5,500,858).

Regarding claims 26, 27, 31 and 32, McKeown differs from present application in that each GSU is provided for each output port and each ASU-1 is provided for each output port while the present application teaches that the first selection unit and second selection unit having equivalent functionality of GSU-1 and GSU-2, respectively are provided for each input port and the third selection unit having equivalent functionality of ASU-1 is provided for the first output port.

It would have been obvious to one having ordinary skill in the art to incorporate GSU as being input port basis and ASU as being output port basis if unexpected arbitration results can be seen from the use of the GSU as being input port basis and ASU as being output port basis.

Regarding claim 33, McKeown further discloses that the GSU-1 operates regardless of GSU-2 (GSU-1 and GSU-2 are in parallel operation) and ASU-1 operates regardless of GSU-2 (ASU-1 and ASU-2 are in parallel operation), see col. 5, lines 5-28 and col. 7, lines 31-42.

Allowable Subject Matter

9. Claims 43 and 44 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

10. The following is a statement of reasons for the indication of allowable subject matter: the prior art of record fails to teach selecting a link from a plurality of links associated with the second input port including the link determined for the first output port in combination with other elements as recited in claim 43.

Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Soon D. Hyun whose telephone number is 571-272-3121. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ricky Q. Ngo can be reached on 571-272-3139. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

S. Hyun
6/23/2005

ANDY LEE
PATENT EXAMINER